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KOKAI PATENT APPLICATION NO. SHO 55-98040

**PAPER FEEDER THAT UTILIZES ADHESIVE TAPE**

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Translation Requested by: Jim McDonell 3M

Translation Provided by: Yoko and Bob Jasper  
Japanese Language Services  
16 Oakridge Drive  
White Bear Lake, MN 55110

(651) 426-3017 Fax (651) 426-8483  
e-mail: [bjasper@attbi.com](mailto:bjasper@attbi.com)

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PAPER FEEDER THAT UTILIZES ADHESIVE TAPE

[*Nen'chaku tehpu o mochiita kyuuhshi sohchi*]

Inventor(s): Seikoh Nitta  
2-255 Miyashita  
Nishi, Kamio-shi

Applicant(s): Toppan Printing Co., Ltd.  
1-5-1 Taito  
Taito-ku, Tokyo

Agent(s): Teruo Akimoto  
Patent attorney  
and 1 other

[There are no amendments to this patent.]

## Specification

### 1. Title of the invention

Paper feeder that utilizes adhesive tape

### 2. Claim of the invention

A paper feeder that utilizes adhesive tape, in which an adhesive tape that comes in contact with the sheet surface of feed paper having air permeability is provided at the underside of an adhesive blade, the aforementioned adhesive blade is provided in correspondence to a mobile frame that travels in the vertical direction and is lowered by a spring at all times, a tilting mobile frame that tilts in the cross direction and in correspondence to the aforementioned mobile frame is further provided, and the aforementioned adhesive blade, which is capable of sliding in one direction in correspondence with the ascending of the aforementioned two mobile frames, is capable of pulling up diagonally by the aforementioned tilting mobile frame.

### 3. Detailed description of the invention

The present invention pertains to a paper feeder that utilizes adhesive tape and is capable of feeding special sheets having air permeability such as non-woven fabric used for printing one at a time, which has not been possible by the vacuum feed systems used in the past. And the feature of the present invention is elastic pressure of the adhesive blade is used as the lowering pressure and the device is structured in such a manner that the bottom surface of the blade is parallel to the sheet at all times.

In general, paper feeding for printers is done by a vacuum system, but it is not possible to use the vacuum system when a air-permeable sheet, for example, porous Japanese papers, porous

papers, fabrics or sheets with fuzz on the surface are used under current conditions, and each sheet must be fed manually in this case.

Furthermore, in examples of the prior art where the above-mentioned air-permeable sheet is fed by a vacuum system, a backing is provided for the above-mentioned sheet with a non-air permeable sheet and removal of the backing sheet is done after printing.

The above-mentioned backing process requires additional time and increased material cost, and productivity is sharply reduced.

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The present invention is based on the above background, and the present invention is a paper feeder that utilizes adhesive tape and is capable of feeding special sheets having air permeability such as non-woven fabrics used for printing, one at a time, while the shape of the sheet is retained, and contact between the blade that retains the sheet and the sheet can be stably achieved. A working example of the present invention is explained in detail below with reference to the drawings.

In Fig. 1, 1 is a stack of air-permeable sheets such as non-woven fabric sheets, 2 is the paper feeder arranged above the above-mentioned sheets.

Paper feeder 2 is basically structured of the first paper feeding unit 2a provided with adhesive blade 4 for guiding of the adhesive tape 3 and the second paper feeding unit 2b provided with a directional brush 5, and the above-mentioned first paper feeding unit 2a and the second paper feeding unit 2b are arranged with a predetermined separation as shown in Fig. 4.

The first paper feeding unit 2a has a structure comprising adhesive blade 4 having a compression surface used for pressure bonding the adhesive surface of the adhesive tape 3 incrementally fed from one reel 6 to another reel 6' to the surface of sheet 1, rod 7 that brings the above-mentioned adhesive blade into contact with the surface of the sheet 1, mobile frame 8, linkage 9 that provides the vertical motion to the above-mentioned mobile frame, mobile frame 10 arranged at the side face of the mobile frame 8, pivot 11 that connects the mobile frame 8 and

mobile frame 10, adhesive tape feed lever 13 arranged at the mobile frame 10 and rotates upon coming into contact with stopper 12, etc. and the adhesive blade 4 is provided so that it is free to slide with mobile frame 8.

In this case, adhesive blade 4 slides along the inclined slot 14 provided at the side of mobile frame 8 in the vertical direction, and the projecting pin 15 provided on the adhesive blade 4 engages the slot 1b provided for the mobile frame 10 and falling of the adhesive blade 4 is prevented.

Meanwhile, the aforementioned stop 12 and stop 17 that comes in contact with the edge of the top side of the mobile frame 10 are provided for bracket 20a fastened to supporting axis 19 of the frame 18 at the main unit side and mobile arm 20b linked to the aforementioned axis, respectively, and spring 21 that applies pressure upon descending is provided for mobile arm 20b via bracket 22.

Furthermore, 13a is stop that regulates the feed lever 13 and the descending position of mobile frame 10 itself, and prevents rotation of the feed lever 13 pressed upward by the spring 13b and receives the mobile frame 10 when forced to descent by spring 10a at the mobile frame 8 side, and 23 is stiffening plate that comes in contact with end of the top side of the sheet 1, and 24 is the exhauster.

The second paper feeding unit 2b has a structure comprising mobile frames 26, 27 and 27' operated by corresponding cam 25 and directional brush 5, etc. provided at the end of bracket 28 retained by the above-mentioned mobile arm, and the brush 5 has a structure comprising vacuum mechanism 5a that applies the aforementioned brush to the surface of sheet 1 under a predetermined force, and air blowing mechanism 5b that enhances slipping at the underside of the sheet by the brush and prevents double-feeding of the sheet.

Therefore, when cam starts to rotate in the clockwise direction as shown in the figure, brush 5 is operated by the follow-up mechanism in which mobile arm 27 rotates in the clockwise direction around bearing 27a as the center, subsequently, by a follower mechanism in which

mobile frame 26 rotates in the counter-clockwise direction with the bearing 26a as the center.

In this case, rotation of cam 25 is achieved in relation to the operation of linkage 9 at the side of first paper feeding unit 2a, and 29 is the transfer roll used to return the sheet 1 fed by the second paper feeding unit 2b by a predetermined distance toward the printer side.

In the work of the present invention, adhesive tape 3 is applied to the under side of the adhesive blade 4 with the adhesive surface facing the sheet side, and the adhesive blade is firmly pressed against the surface of the sheet 1 upon descending of the linkage 9 as shown in Fig. 1.

In this case, adhesive blade 4 is firmly pressed against the surface of the sheet by the descending pressure of linkage 9.

Therefore, even when the level of the upper side of the sheet varies due to unbalancing factor of the table lifter, an appropriate bonding pressure of the adhesive blade 4 for the surface of the sheet can be achieved and adhesion can be achieved under the above-mentioned pressure. Furthermore, the blade member for the blade holder 4' of the adhesive blade 4 may be made of an elastic material as shown in Fig. 2 as well.

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In the vertical motion of the mobile frame 9, the mobile frame 10 goes upward with ascending of mobile frame 8 until the mobile frame 10 comes in contact with stop 17, and as the mobile frame 10 comes in contact with stop 17, mobile frame 10 pulls the side of reel 6 upon ascending of the pivot 11, and adhesive blade 4 forms an engagement with slot 16 for pin 15 and the adhesive blade 10 is pressed forward along the inclined slot 14 of the mobile frame 8 as a result of the inclining motion.

Therefore, the above-mentioned adhesive blade 4 does not simply travel in the upward direction, but is pressed forward by the ascending force of the mobile frame 10, thus, the sheet 1 lifted upward by the mobile frame 10 is likely to pass through the stiffening plate 23 and exhauster 24, and at the same time, the sheet 1 can be supplied toward the feeding direction.

Meanwhile, when mobile frame 10 ascends to the predetermined position, feed lever 13

forms contact with stop 12 and undergoes rotation in the clock-wise direction up to the predetermined position, and prepares to take-up adhesive blade 7 by a predetermined length.

Furthermore, stiffening plate 23 prevents unintended lifting of a second sheet at the time of lifting of the first sheet by adhesive blade 4, and exhauster 24 blows air between the first sheet and the second sheet to separate the sheets.

Upon operation of the above-mentioned first paper feeding unit 2a, the second paper feeding unit 2b starts to operate at the same time, the brush 5 comes in contact with the sheet 1 lifted by the adhesive blade 4 at the front portion, at the same time, the brush 5 is pressed onto the sheet by the vacuum mechanism 5a, and the first sheet is slid over the second sheet by brush 5 as the second paper feeding unit 2b descends with the first paper feeding unit 2a and the sheet is fed to the side of transfer rollers 29.

In this manner, sheet 1 retained by the adhesive blade 4 is detached from the adhesive blade by the brush at the time of descending of the adhesive blade, and the above-mentioned sheet is conveyed by the transfer rollers 29. Furthermore, air blowing mechanism 5b forms an air layer between the first and second sheets, and promotes separation of the sheets, and at the same time, brush 5 utilizes air-permeability of the sheet and prevents the second sheet from coming into contact with the brush.

With descending of the first paper feeding unit 2a, the feed lever 13 is separated from stop 12 and rotates to the predetermined position by spring 13b, and a new adhesive surface appears under the adhesive blade 4 as a result of the above-mentioned rotation of the reel 6' and is used for subsequent lifting of another sheet (see Fig. 1 for reference). Furthermore, the second paper feeding unit 2b is returned to the position shown in Fig. 1 after the sheet is removed by transfer roll 29 via return spring (not shown in the fig.), and a cycle of the paper feed process is completed.

Furthermore, exhauster 24 returns to the upward position after the above-mentioned cycle is completed, and in this case, the tray loaded with sheets 1 is lifted slightly as a result of a signal

from a microswitch not shown in the fig., and the top side of the sheet to be supplied remains at the same level at all times.

The present invention is structured as described above, and paper feeding can be easily and securely achieved based on the adhesive blade 4 of the first paper feeding unit 2a and the brush 5 and 5b and air blowing mechanism of the second paper feeding unit 2b even when paper feeding is performed for an air-permeable sheet such as a non-woven fabric. As a result, double feeding does not occur even when the sheet used for paper feeding are thin sheets, and problems of manual feeding of sheet can be eliminated. It should be noted that the paper feeder made up of the first paper feeding unit 2a and the second paper feeding unit 2b are provided for the both ends of sheet 1 with exhauster 24 at the center as shown in Fig. 4.

#### 4. Brief description of figures

The figures show a working example of the present invention, and Fig. 1 is the side view of the paper feeder, Fig. 2 is the explanatory view of the adhesive blade, Fig. 3 is the explanatory view that shows operation of Fig. 1, and Fig. 4 is the back side of Fig. 1 observed from the left side.

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#### Explanation of codes

- 1: Sheet
- 2: Paper feeder
- 2a: First paper feeding unit
- 2b: Second paper feeding unit
- 3: Adhesive tape
- 4: Adhesive blade
- 4': Blade holder
- 5: Brush

5a: Vacuum mechanism

5b: Air blowing mechanism

6, 6': Reels

7: Rod

8, 10: Mobile frame

9: Linkage

10a, 13b, 21: Springs

11: Pivot

12, 13a, 17: Stops

13: Feed lever

14: Inclined slot

15: Pin

16: Slot

18: Frame

19, 26a, 27a: Bearings

20a, 22, 28: Brackets

20b, 26, 27, 27': Mobile arms

23: Stiffening plate

24: Exhauster

25: Cam

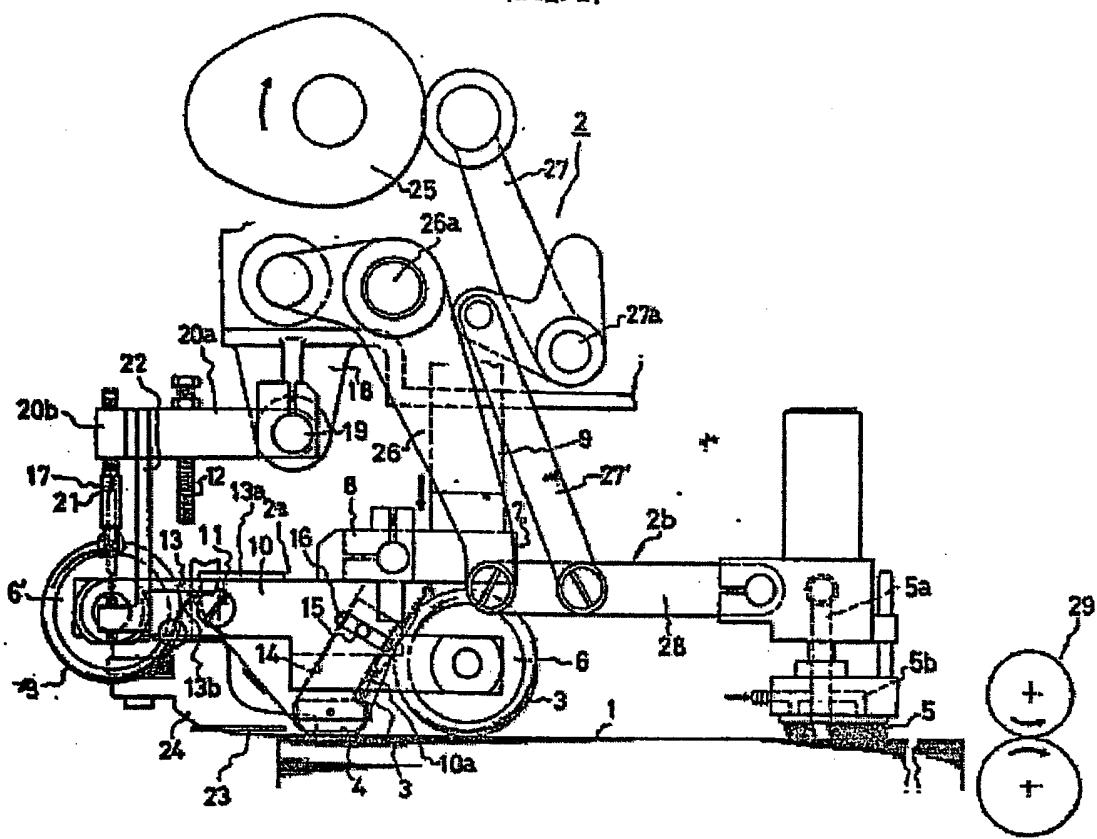
29: Transfer roller

Applicant: Toppan Printing Co., Ltd.

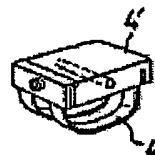
Agent: Teruo Akimoto, patent attorney, et al.

[p. 5]

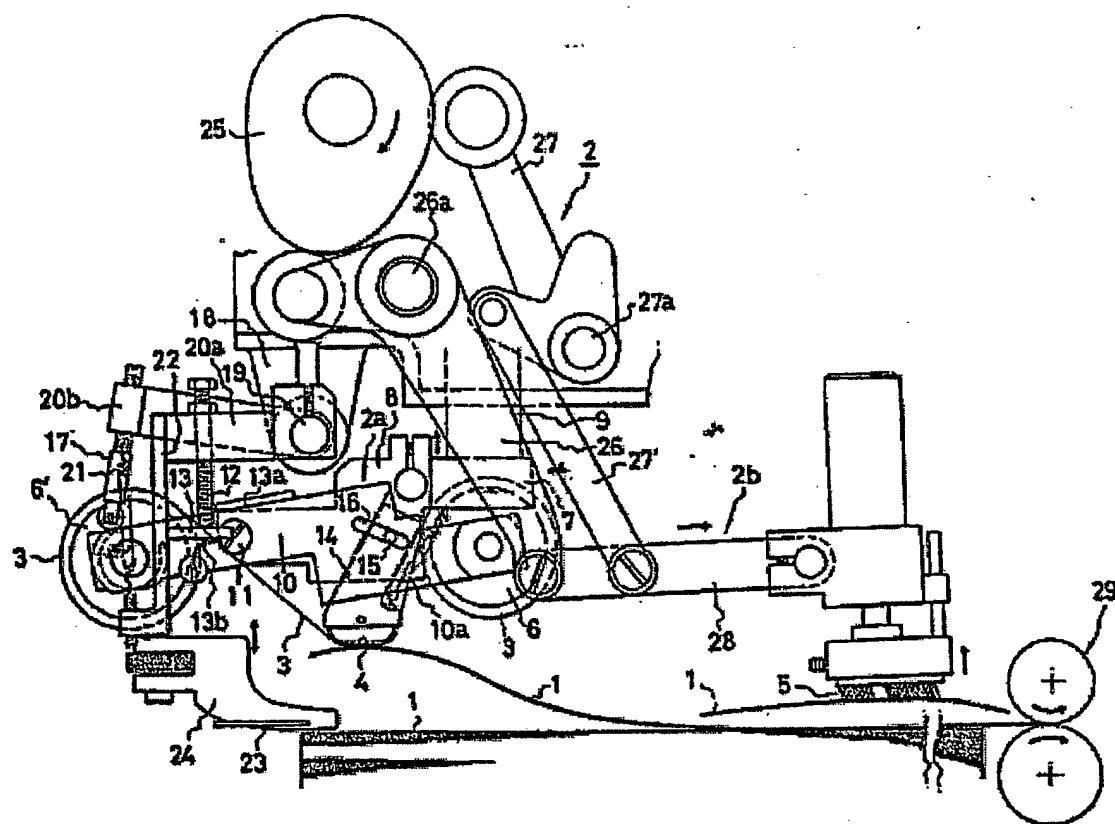
[Fig. 1]



[Fig. 2]



[Fig. 3]



[Fig. 4]

